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Inventor: **AKIRA YOSHIDA**

For: **WINDOW DISPLAY DEVICE and METHOD, and RECORDING MEDIUM RECORDING a WINDOW DISPLAY CONTROL PROGRAM**

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_X_ 5 sheet(s) of informal drawing(s)
_X_ A Declaration and Power of Attorney
___ Information Disclosure Statement (PTO Form 1449)
_X_ A certified copy of a ____JAPAN____ application.

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Respectfully submitted,
AKIRA YOSHIDA

John H. Holcombe
(#20,620)
Attorney for Applicants
Telephone 520-760-6629
IBM Corporation
Intellectual Property Law
555 Bailey Avenue J46/G463
San Jose, CA 95141

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WINDOW DISPLAY DEVICE AND METHOD, AND A RECORDING MEDIUM RECORDING A WINDOW DISPLAY CONTROL PROGRAM

TECHNICAL FIELD

This invention relates to a page scrolling technique for scrolling reduced images of page displayed in a window on a display screen of a display device and, in particular, to a window display device, a method of displaying a window and a recording medium recording a window display control program for displaying an enlarged main screen displaying a part of a page, a sub screen displaying the entire image of that page in a reduced form and pages preceding and following that page in a reduced form.

BACKGROUND OF THE INVENTION

There has been proposed, in a data processing system such as a workstation and a personal computer, an electronic filing system (PUPA 6-168276) or an image database system (PUPA 4-28786) for recording, saving and re-utilizing document image data. Also, an interactive processing system (PUPA 6-259211) has been

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disclosed in which a plurality of interface parts (menu and the

like) for executing user interface function on the display screen

of a display device are disposed in a manipulation screen panel

of one window.

5   Further, among contributions to expansion of man-machine

interface function of such information systems, a window display

method has been provided ("DocuPlus V1.0 Operation Guide", -1-j,

pp.1-5, January 29, 1997, IBM Japan) in which, in displaying

image data having a page delimiter on a display screen, images of

10   all pages are displayed in a reduced form in the window together

with a main screen which displays a part of pages with

enlargement, and mouse clicking on a reduced screen of a page

(called thumb nail) to be moved causes the main screen to be

replaced with that page. With this window display method, the

15   user can visually confirm the page to be moved, easily select the

page of the desired screen simply by mouse manipulation and

immediately confirm the detail of the content in the enlarged

screen so that searching information is expedited with ease.

In the above described window display method, however, it is

20   necessary to adjust the display position of the main screen after

the page has been switched because the area displayed in the main

screen is not shown in the reduced screen in switching the screen

which is to be displayed with enlargement. In addition, when the

reduced screen to be displayed with enlargement lies at the edge

of the screen, adjustment of display position of the main screen

has to be done at the edge of the window screen. Further, when a

preceding or a next page which does not appear on the display

5   screen is to be manipulated, the user has to command scrolling

each time it is manipulated.

SUMMARY OF THE INVENTION

In view of the above, it is an object of this invention to

provide a window display device, a method of displaying window

10   and a recording medium recording a window display control program

which allows the page which the user wants to move to be moved to

a desired area by a single manipulation.

It is another object of this invention to allow the

customarily used operation on preceding/next page to be done

15   simply by manipulation of a pointing device without using a key.

To achieve the above objectives, one aspect of this

invention comprises, a window display device which displays image

data on a display screen a first sub-screen displaying a first

area of image data, a main screen displaying a part of the first

20   area with enlargement, a second sub-screen displaying a second

area which is adjacent to the first area, a first sub-screen

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image window for displaying an area displayed in the main screen
with a display indicating frame on the first sub-screen, a main
screen image window for moving the display indicating frame and
the display area within the main screen in correspondence to an
output representing movement of a pointing device as notified by
the first sub-screen window, the first sub-screen window causing
the display indicating frame to be moved within the first sub-
screen while the pointing device is in dragging state and, a
second sub-screen image window for displaying the display
indicating frame in the second sub-screen when the pointing
device has moved the display indicating frame by dragging it into
the second sub-screen.

Another aspect of this invention comprises, a window display
device which displays image data having a page delimiter on a
display screen a main screen displaying a part of a page with
enlargement, a first sub-screen displaying the image of that page
in a sub-screen column, a second sub-screen displaying one or
more second areas which is adjacent to the page, a first sub-
screen image window for displaying a reduced image of a page
which is currently displayed on the main screen with the area
displayed in the main screen indicated by a display indicating
frame, a main screen image window for moving the display
indicating frame and the display area within the main screen in

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correspondence to an output representing movement of a pointing
device as notified by the first sub-screen window, the first sub-
screen window causing the display indicating frame to be moved
within the same page while the pointing device is in dragging

5   state, a second sub-screen image window for displaying the
display indicating frame in the second sub-screen when the
pointing device has moved the display indicating frame by
dragging it into the second sub-screen, a display screen parent
window operative when the pointing device has dropped the display

10   indicating frame at an arbitrary place on the second screen to
which the pointing device moved, for switching the main screen to
the page to which the pointing device moved and displaying the
place indicated by the display indicating frame in the main
screen and a sub-screen parent window for scrolling the sub-

15   screen so that the sub-screen of the page displayed on the main
screen comes to a predetermined position of the sub-screen
column.

In the above, the sub-screen parent window scrolls the sub-
screen so that the sub-screen of the page displayed on the main

20   screen comes to substantially the central position of the sub-
screen column.

Another aspect of this invention comprises a window display
method of displaying image data on a display screen of a display

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device having a first sub-screen displaying a first area of image

data, a main screen displaying a part of the first area with

enlargement and a second sub-screen displaying a second area

which is adjacent to the first area, the method comprising the

5   steps of; displaying an area displayed in the main screen with a

display indicating frame on the first sub-screen, moving the

display indicating frame and the display area within the main

screen in correspondence to the movement of a pointing device

which causes the display indicating frame to be moved within the

10   first sub-screen while the pointing device is in dragging state

and, displaying the display indicating frame in the second sub-

screen when the pointing device has moved the display indicating

frame by dragging it into the second sub-screen.

Another aspect of this invention comprises a window display

15   method of displaying image data having a page delimiter on a

display screen of a display device having a main screen

displaying a part of a page with enlargement, a first sub-screen

displaying the image of that page and a second sub-screen

displaying one or more second areas which is adjacent to the

20   page, the method comprising the steps of; displaying a reduced

image of a page which is currently displayed on the main screen

with the area displayed in the main screen indicated by a display

indicating frame, moving the display indicating frame and the

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display area within the main screen in correspondence to the movement of a pointing device which causes the display indicating frame to be moved within the same page while the pointing device is in dragging state, displaying the display indicating frame in the second sub-screen when the pointing device has moved the display indicating frame by dragging it into the second sub-screen, switching the main screen to the page to which the pointing device moved to display the place indicated by the display indicating frame in the main screen when the pointing device has dropped the display indicating frame at an arbitrary place on the second screen to which the pointing device moved to display the place indicated by the display indicating frame in the main screen, and scrolling the sub-screen so that the sub-screen of the page displayed on the main screen comes to a predetermined position of the sub-screen column.

Another aspect of this invention relates to a recording medium recording a display control program for displaying image data on a display screen of a display device, the display control program causing a computer to: display a first sub-screen displaying a first area of image data, display a main screen displaying a part of the first area with enlargement, display a second sub-screen displaying a second area which is adjacent to the first area display the area displayed in the main screen on

the first sub-screen with a display indicating frame, move the

display indicating frame and the display area within the main

screen in correspondence to the movement of a pointing device

which causes the display indicating frame to be moved within the

5   first sub-screen while the pointing device is in dragging state

and, display the display indicating frame in the second sub-

screen when the pointing device has moved the display indicating

frame by dragging it into the second sub-screen.

Another aspect of this invention relates to a recording

10   medium recording a display control program for displaying image

data having a page delimiter on a display screen of a display

device, the display control program causing a computer to:

including a main screen displaying a part of a page with

enlargement, a first sub-screen displaying the image of that page

15   and a second sub-screen displaying one or more second areas which

is adjacent to the page display a reduced image of a page which

is currently displayed on the main screen with the area displayed

in the main screen indicated by a display indicating frame, move

the display indicating frame and the display area within the main

20   screen in correspondence to the movement of a pointing device

which causes the display indicating frame to be moved within the

same page while the pointing device is in dragging state,

display the display indicating frame in the second sub-screen

when the pointing device has moved the display indicating frame

by dragging it into the second sub-screen, switching the main

screen to the page to which the pointing device moved to display

the place indicated by the display indicating frame in the main

5   screen, when the pointing device has dropped the display

indicating frame at an arbitrary place on the second screen to

which the pointing device moved and, scroll the sub-screen so

that the sub-screen of the page displayed on the main screen

comes to a predetermined position of the sub-screen column.

10   For a fuller understanding of the present invention,

reference should be made to the following detailed description

taken in conjunction with the accompanying drawings.

                    BRIEF DESCRIPTION OF THE DRAWINGS

        Fig. 1 is a block diagram of a hardware configuration of a

15   data processing system to which this invention is preferably

applied.

        Fig. 2 is a plan view of a detailed example of the display

screen implementing the visual page scrolling function of this

invention.

Fig. 3 is a schematic diagram showing the steps of operation of this invention.

Fig. 4 is a block diagram showing a program structure of the window implementing the visual page scrolling function of this
5   invention.

Fig. 5 is a flow chart showing an example of control operation of the window of Fig. 4.

DETAILED DESCRIPTION OF THE INVENTION

Embodiments of the invention will now be described with
10   reference to the drawings herewith.

Hardware Embodiment

Fig. 1 shows an example of a hardware configuration of a data processing system to which this invention is preferably applied. The data processing system 100 may be implemented by a
15   conventional workstation and a personal computer and comprises a main CPU (central processing unit) 1 such as a microprocessor which controls arithmetic operation of the entire system and a

main memory **4** which is used for working area of the CPU.   The CPU

1 and the main memory **4** are connected to other components

including a hard disk device **13** as an auxiliary storage, a ROM **14**

for storing a constant, a serial port **15** for a modem, a parallel

5 port **16** for a printer, a timer **17** and a communication adapter **18**

through a bus **2**.

  A floppy disk device **20** which drives a floppy disk such as

MO and CD-ROM is connected to the bus **2** through a floppy disk

controller **19**. A computer program code as shown in Fig.5 which

10 gives instructions to the CPU and the like in cooperation with an

operating system to practice this invention is recorded in the

floppy disk, the hard disk device **13** and the ROM **14** and executed

by being loaded in the memory **4**.

  Further, as a user interface hardware, there are a pointing

15 device **7** such as a mouse and a joystick, a keyboard **6** and a

display (image display device) **12** as shown in Fig. 2 for

displaying an image.   The mouse **7** and the keyboard **6** are

connected to the bus **2** via a keyboard mouse controller **5**.   A

display device **11** such as the display **12** and a display lump are

20 connected to the bus **2** via a display drive control device **10**

having a digital-analog converter and a video graphic array **8** to

which is also connected a video RAM **9**.   A speaker **23** receives an

audio signal which is digital-analog converted by an audio

controller **21** via an amplifier **22** for output as a voice. The

audio information from a microphone **24** is taken in the system

after it is analog-digital converted by the audio controller **21**.

5   It should be understood that these components are shown as an

example and all of them are not necessarily indispensable

components of this invention. For instance, the microphone **24**

may be removed and instead an image reading device or a character

recognition device may be connected if needed.

10   While an operating system which supports as a standard a GUI

(graphic user interface) multi-window environment such as Windows

(trademark of Microsoft), OS/2 (trademark of IBM) and X-WINDOW

system (trademark of MIT) on AIX (trademark of IBM) is

preferable, those supporting a character base environment such as

15   PC-DOS (trademark of IBM) and MS-DOS (trademark of Microsoft) may

be workable because the GUI environment may be provided in the

application side and the operating system is not limited to any

specific operating system environment.

Embodiment of Display Screen

20   Fig. **2** shows a detailed example of a display screen

implementing a visual page scrolling function of this invention.

In this figure, **50** is a main screen (main window screen) displaying a part of a page with enlargement in displaying image data which has a page delimiter in the display **12** in Fig. **1**. **51** is a sub-screen (page view sub-window screen) displaying the

5   image of the entire page which is currently displayed on the main screen **50**. **52** is a sub-screen displaying the page preceding to the page currently displayed on the main screen **50** while **53** is a sub-screen displaying the page next to the page currently displayed on the main screen **50**.

10   These sub-screens **52, 51, 53** are so laid out that they are disposed vertically in sequence at the right edge of the display screen with the sub-screen **51** of the page displayed on the main screen **50** being at the center of the sequence. In other word, in page movement, the sub-screen is scrolled so that the reduced

15   screen of the moved page comes to the display position of **51**.

While one preceding page and one next pages of the central sub-screen **51** are displayed in the example shown in Fig. **2**, more pages may be displayed. For example, when the display area of the main screen **50** is relatively small, all pages (e.g., more

20   than 10 pages) may be displayed at one time. Further, when the image continues horizontally and vertically as in the case of a map, a two dimensional array is possible.

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The area currently displayed in the main screen **50** is displayed with a rectangle (hereinafter called a view frame) **60** on the sub-screen **51** of the page which is displayed on the main screen **50** in order to indicate in which part of the entire page

5 it is. The rectangle of the view frame **60** is either uniformly painted with a predetermined light color or displayed in inverted color so as to make the extent of display of the current main screen immediately recognizable on the sub-screen **51**. Incidentally, this view frame **60** may be called either one of a

10 display indicating frame, a document display area, an inverted area and a display position rectangle.

Examples of various tool bar buttons **31** - **46** are displayed in the upper part of the main screen **50**. Depression of a page designating button **34** in the tool bar causes a jump to the

15 designated page, depression of a start page button **35** causes the first page to be displayed, depression of a last page button **36** causes the last page to be displayed, depression of a preceding page button causes the preceding page to be displayed and depression of a next page button causes the next page to be

20 displayed.

With respect to the main screen **50**, depression of counterclockwise rotation button **39** in the tool bar causes the

display screen to be rotated counterclockwise, depression of

clockwise rotation button **40** causes the display screen to be

rotated clockwise, depression of maximize button **41** causes the

screen displayed to be maximized, depression of minimize button

5   **42** causes the screen displayed to be minimized, depression of

enlarge button **43** causes the screen displayed to be enlarged and

depression of reduce button 44 causes the screen displayed to be

reduced.

The sub-screen **51** - **53** may be selectively displayed or not

10   displayed as required. By selecting window view in the menu or

depressing the page view button **45** in the tool bar, display/non

display is alternated. In addition, the number of sub-screens of

display (e.g., 7 at maximum) may be variably set.

In addition, there are a help button **46** displaying a help

15   screen, a print button **31** for printing a ledger, a check stamp

menu button **32** displaying check stamp menu and, a search button

33 for searching through the ledger. Further, information

relating to the display of the main screen **50** is displayed in

letters above the buttons **31** - **46** of the tool bar. However,

20   these buttons and messages are for exemplary purpose and all of

them are not necessarily indispensable components. A screen

structure of different layout may be used.

Mode of Operation

Next, an example of operation of this invention is now

described with reference to Fig. **3**.   Incidentally, this figure is

schematically depicted by eliminating various buttons and

5   document displays of Fig. **2** to simplify the illustration.

As shown in Fig. **3(A)**, the area displayed in the main screen

is displayed by a rectangular view frame **60** on the sub-screen **51**

of the page (page 12 in this figure) currently displayed on the

main screen **50**.   The view frame **60** is shown, for example, as an

10   inverted area by inverted display.   By dragging the view frame

(with the left button of the mouse held depressed within the view

frame **60**) in the central sub-screen **51** through the same page, the

display area in the main screen **50** also moves in real time.

Next, by dragging the view frame **60** to the neighboring page,

15   e.g., the preceding page (page 11 in this figure), the view frame

60 moves into the sub-screen **52** to which the view frame **60** moved.

By dropping (releasing the left button of the mouse) at a

place on the sub-screen **51** to which the view frame is dragged and

where it is desired to display, the main screen **50** switches to

20   that page (page 11) at the timing of dropping as shown in Fig.

3(C) to display the place indicated by the rectangular view frame

60 in the main screen **50**. Simultaneously, the sub-screen is
scrolled so that the sub-screen of the page displayed in the main
screen **50** comes to the center of the sub-screen column.

By repeating the above operation, consecutive preceding

5   pages (or following pages) are displayed one after another on the
main screen and thus the sub-screen is scrolled so that this
provides the visual page scrolling function in lieu of the next
page/preceding page key or the next page/preceding page button
37, 38.

10   While movement to the preceding page is shown in Fig. **3**, the
same visual page scrolling as the above described one is
performed by the same operation as the above for movement to the
next page.

Display Control Method

15   Fig. **4** shows a program structure of the window for
implementing the visual page scrolling function of this invention
described in Fig. **3** and the flow chart of Fig. **5** shows an example
of the control procedure therefor.

The window implementing this invention (window procedure)

20   comprises n sub-screen image windows **201** corresponding to the
number of sub-screens n, sub-screen parent window **210**, main

screen image window **220** and display screen parent window **230** as

shown in Fig. **4** and information is exchanged as shown by the

arrow heads in Fig. **4**.

The sub-screen image window **201** provides movement and re-

5   drawing of the view frame **60** according to dragging and dropping

of the mouse and the movement of the mouse. The sub-screen

parent window **210** provides creation and movement (scroll) of the

sub-screen image window **201** corresponding to the moved page which

is notified from the sub-screen image window **201**.

10   The main screen image window **220** provides; movement of the

display screen position of the main screen **50** corresponding to

the movement of the mouse which is notified from the sub-screen

image window **201**, drawing of the page designated corresponding to

the moved page which is notified from the sub-screen image window

15   **201** and, movement of the display screen position of the main

screen **50** corresponding to the display position information which

is then notified from the sub-screen image window **201**.

Next, the control operation in the embodiment of this

invention is now described in detail with reference to the flow

20   chart of Fig. **5**. In the figure, **S** represents a step.

First of all, when the sub-screen image window **201** of the

sub-screen **51** of the page currently displayed on the main screen

50 detects that the view frame **60** (inverted area) has been

dragged by the mouse (**S1**), acquisition of WM-MOUSEMOVE message

(signal) of the mouse **7**, that is so called mouse·capture is

started (**S2**).

5   When the sub-screen image window **201** detects that the view

frame **60** has moved within the sub-screen **51** (**S3**) based on the

output of the mouse (WM-MOUSEMOVE), it causes the view frame **60**

on the sub-screen **51** to move corresponding to the movement of the

mouse and notifies the movement to the main screen image window

10 **220** (**S4**). When the view frame **60** is dropped, the process is

terminated as it is while the process returns to the

determination at **S3** when it is not dropped (**S5**).

     The main screen image window **220** provides movement of

display screen position of the main screen **50** corresponding to

15 the movement of the mouse which is notified from the sub-screen

image window **201** (**S6**). Thus, by dragging the view frame **60** in

the central sub-screen **51** within the same page, the display area

within the main screen also moves in real time.

     On the other hand, when the sub-screen image window **201**

20 determines based on the output of the mouse that it moves out of

the sub-screen **51** into the sub-screen of another page (**S3**), it

re-draws an inverted rectangle of the view frame **60** in the moved

sub-screen (**S7**). The sub-screen image window **201** then determines

whether or not the mouse is dropped (**S8**) and the process returns

to the determination step **S3** if not dropped while the moved page

is notified to the sub-screen parent window **210** and the main

5   screen image window **220** substantially simultaneously (**S9**) if

dropped.

When the sub-screen parent window **210** is notified of the

moved page from the sub-screen image window **201**, it provides

creation and movement (scroll) of the sub-screen image window **201**

10   so that the sub-screen of the designated page is displayed at the

center.

When the main screen image window **220** receives a

notification of the moved page from the sub-screen image window

201, it provides a reference drawing of the designated page for

15   the main screen **50** (**S11**) and notifies sub-screen image window **201**

of completion of drawing when drawing is completed (**S12**). When

the sub-screen image window **201** receives the notification of

completion of drawing, it notifies the main screen image window

220 of the display position information of the view frame **60**

20   (**S13**). When the main screen image window receives the

notification of the display position information, it moves the

20

display screen position of the main screen **50** corresponding to the notified display position information (**S14**).

Because the sub-screen image window **201** is processed in parallel with the main screen image window **220**, dragging the view frame to a neighboring page causes the main screen **50** to be switched to that page at the time the view frame is dropped and the place indicated by the view frame **60** is displayed in the main screen while the sub-screen is scrolled so that the sub-screen of the page displayed in the main screen comes to the center of the sub-screen column.

Although omitted in the flow chart of Fig. **5**, when the page designation button **34** of Fig. **2** is depressed in the tool bar, the page jumps to the designated page which is displayed in the main screen **50** and the sub-screen **51** of that page is displayed in the center of the sub-screen column. However, when the page jumps to the first page by the page designation button **34** or the start page button **35** of Fig. **2** is depressed, the sub-screen **52** of the first page is displayed on top of the sub-screen column in displaying the first page in the main screen **50**. Similarly, when the page jumps to the last page or the last page button **36** of Fig. **2** is depressed, the sub-screen **53** of the last page is

displayed at the tail of the sub-screen column in displaying the last page in the main screen **50**.

While a mouse was shown as an input means in the above embodiment of this invention, the input means may include other pointing devices (coordinate indicator) such as a track pad, a track ball, a digitized, a tablet and a joystick without being limited to a mouse.

While display of image data having a page delimiter was shown in the above embodiment, this invention is not limited to such image data. By providing a sub-screen into which a part of entire drawing is reduced, a simple movement to a place to which movement is desired is also possible for image data such as a map which is not delimited by page.

Further, the embodiment of this invention includes a recording medium which stored therein a control program represented by a software implementing this invention.

Effect of Invention

As described in the above, the following effects are obtained according to this invention.

(1) The user can move to an area where it is desired to display in the page to which it is desired to move at one manipulation because the user can instantly see which place is displayed with enlargement when switching screens by seeing the movement display

5   of the view frame (display indication frame).

(2) Because the sub-screen is scrolled so that the sub-screen of the switched screen is displayed substantially at the center of the sub-screen column in switching screens, next page/preceding page operation which is frequently used in practice can be simply

10   done only by manipulating a pointing device without using a key. Therefore, movement of user's eye and hand is minimized thereby contributing to faster and easier operation as well as user friendliness.

(3) By displaying a plurality of sub-screens into which image of

15   an entire page is reduced and scrolling the sub-screen so that the sub-screen of the switched screen is displayed substantially in the center of the sub-screen column in switching screens, the user can easily and quickly confirm visually the page which it is desired to move for moving the page.

20   While the preferred embodiments of the present invention have been illustrated in detail, it should be apparent that

modifications and adaptations to those embodiments may occur to one skilled in the art without departing from the scope of the present invention as set forth in the following claims.

Description of Reference Numbers

5   **1:** Main CPU

      2: Bus

      4: Main Memory

      5: Keyboard Mouse Controller

      7: Mouse

10   **12:** Display

      14: ROM

      50: Main Screen

      51, 52, 53: Sub-screen

      60: View Frame (display indicating frame)

15   **201:** Sub-screen Image Window

      210: Sub-screen Parent Window

      220: Main Screen Image Window

      230: Display Screen Parent Window

I claim:

1   **1.**   A window display device which displays image data on a

2   display screen, comprising:

3   a first sub-screen displaying a first area of image data;

4   a main screen displaying a part of said first area with

5   enlargement;

6   a second sub-screen displaying a second area which is

7   adjacent to said first area;

8   a first sub-screen image window for displaying an area

9   displayed in said main screen with a display indicating frame on

10   said first sub-screen;

11   a main screen image window for moving said display

12   indicating frame and said display area within said main screen in

13   correspondence to an output representing movement of a pointing

14   device as notified by said first sub-screen window, said first

15   sub-screen window causing said display indicating frame to be

16   moved within said first sub-screen while said pointing device is

17   in dragging state; and

18   a second sub-screen image window for displaying said display

19   indicating frame in said second sub-screen when said pointing

20   device has moved said display indicating frame by dragging it

21   into said second sub-screen.

1   **2.**   A window display device which displays image data having a

2   page delimiter on a display screen, comprising:

3   a first sub-screen displaying a first area of image data in

4   a sub-screen column;

5   a main screen displaying a part of said first area with

6   enlargement;

7   a second sub-screen displaying in said sub-screen column a

8   second area which is adjacent to said first area;

9   a first sub-screen image window for displaying a reduced

10   image of a page which is currently displayed on said main screen

11   with said area displayed in said main screen indicated by a

12   display indicating frame;

13   a main screen image window for moving said display

14   indicating frame and said display area within said main screen in

15   correspondence to an output representing movement of a pointing

16   device as notified by said first sub-screen window, said first

17   sub-screen window causing said display indicating frame to be

18   moved within the same page while said pointing device is in

19   dragging state;

20   a second sub-screen image window for displaying said display

21   indicating frame in said second sub-screen when said pointing

22   device has moved said display indicating frame by dragging it

23   into said second sub-screen;

24   a display screen parent window operative when said pointing

25 device has dropped said display indicating frame at an arbitrary

26 place on said second screen to which said pointing device moved,

27 for switching said main screen to the page to which said pointing

28 device moved and displaying the place indicated by said display

29 indicating frame in said main screen; and

30   a sub-screen parent window for scrolling said sub-screen so

31 that the sub-screen of the page displayed on said main screen

32 comes to a predetermined position of said sub-screen column.

3. The window display device of Claim 2 in which said sub-

screen parent window scrolls said sub-screen so that the sub-

screen of the page displayed on said main screen comes to

substantially the central position of said sub-screen column.

1   **4.**   A window display method of displaying image data on a

2   display screen of a display device having a first sub-screen

3   displaying a first area of image data, a main screen displaying a

4   part of said first area with enlargement and a second sub-screen

5   displaying a second area which is adjacent to said first area,

6   said window display method comprising the steps of:

7   displaying an area displayed in said main screen with a

8   display indicating frame on said first sub-screen;

9   moving said display indicating frame and the display area

10   within said main screen in correspondence to the movement of a

11   pointing device which causes said display indicating frame to be

12   moved within said first sub-screen while said pointing device is

13   in dragging state;   and

14   displaying said display indicating frame in said second sub-

15   screen when said pointing device has moved said display

16   indicating frame by dragging it into said second sub-screen.

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1   **5.**   A window display method of displaying image data having a

2   page delimiter on a display screen of a display device having a

3   main screen displaying a part of a page with enlargement, a first

4   sub-screen displaying the image of that page in a sub-screen

5   column and a second sub-screen displaying one or more second

6   areas which is adjacent to said page, said window display method

7   comprising the steps of:

8   displaying a reduced image of a page which is currently

9   displayed on said main screen with the area displayed in said

10   main screen indicated by a display indicating frame;

11   moving said display indicating frame and said display area

12   within said main screen in correspondence to the movement of a

13   pointing device which causes said display indicating frame to be

14   moved within the same page while said pointing device is in

15   dragging state;

16   displaying said display indicating frame in said second sub-

17   screen when said pointing device has moved said display

18   indicating frame by dragging it into said second sub-screen;

19   switching said main screen to the page to which said

20   pointing device moved to display the place indicated by said

21   display indicating frame in said main screen when said pointing

22   device has dropped said display indicating frame at an arbitrary

23   place on said second screen to which the pointing device moved to

24 display the place indicated by said display indicating frame in

25 said main screen;   and

26   scrolling said sub-screen so that the sub-screen of the page

27 displayed on said main screen comes to a predetermined position

28 of said sub-screen column.

1   **6.**   A recording medium recording a display control program for

2   operating a computer system having a display device for

3   displaying image data on a display screen of said display device,

4   said display control program causing said computer system to:

5   display a first sub-screen displaying a first area of image

6   data;

7   display a main screen displaying a part of said first area

8   with enlargement;

9   display a second sub-screen displaying a second area which

10   is adjacent to said first area;

11   display the area displayed in said main screen on said first

12   sub-screen with a display indicating frame;

13   move said display indicating frame and said display area

14   within said main screen in correspondence to the movement of a

15   pointing device which causes said display indicating frame to be

16   moved within said first sub-screen while said pointing device is

17   in dragging state; and

18   display said display indicating frame in said second sub-

19   screen when said pointing device has moved said display

20   indicating frame by dragging it into said second sub-screen.

1   **7.**   A recording medium recording a display control program for

2 operating a computer system having a display device for image

3 data having a page delimiter on a display screen of a display

4 device, said display control program causing said computer system

5 to:

6   display a main screen displaying a part of a page with

7 enlargement:

8   display first sub-screen displaying the image of that page

9 in a sub-screen column;

10   display a second sub-screen displaying one or more second

11 areas which is adjacent to said page in said sub-screen column;

12   display a reduced image of a page which is currently

13 displayed on said main screen with the area displayed in said

14 main screen indicated by a display indicating frame;

15   move said display indicating frame and said display area

16 within said main screen in correspondence to the movement of a

17 pointing device which causes said display indicating frame to be

18 moved within the same page while said pointing device is in

19 dragging state;

20   display said display indicating frame in said second sub-

21 screen when said pointing device has moved said display

22 indicating frame by dragging it into said second sub-screen;

23   switching said main screen to the page to which said

24   pointing device moved to display the place indicated by said

25   display indicating frame in said main screen, when said pointing

26   device has dropped said display indicating frame at an arbitrary

27   place on said second screen to which said pointing device moved;

28   and

29   scroll said sub-screen so that the sub-screen of the page

30   displayed on said main screen comes to a predetermined position
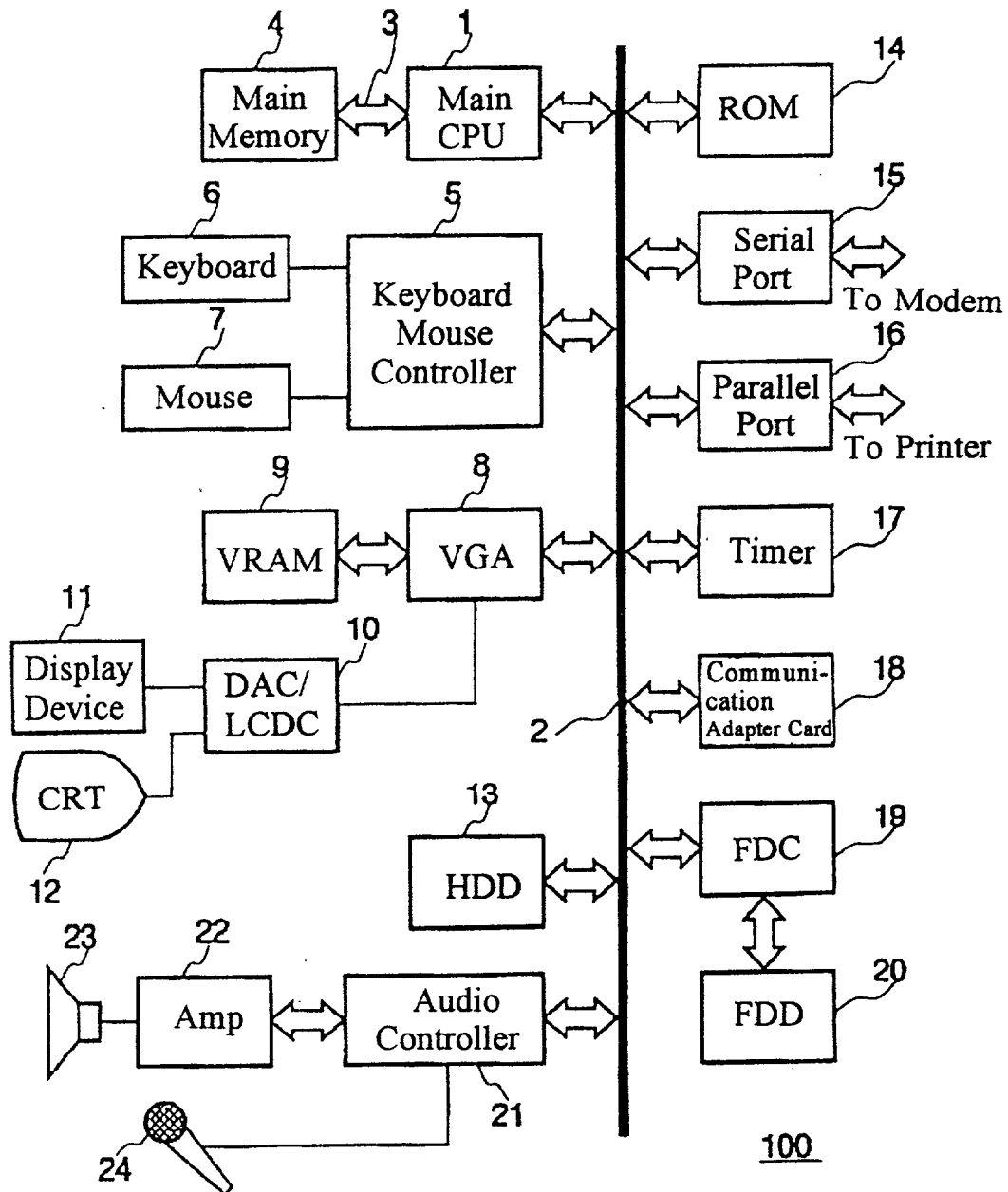
31   of said sub-screen column.

JA997028

WINDOW DISPLAY DEVICE AND METHOD, AND A RECORDING MEDIUM RECORDING A WINDOW DISPLAY CONTROL PROGRAM
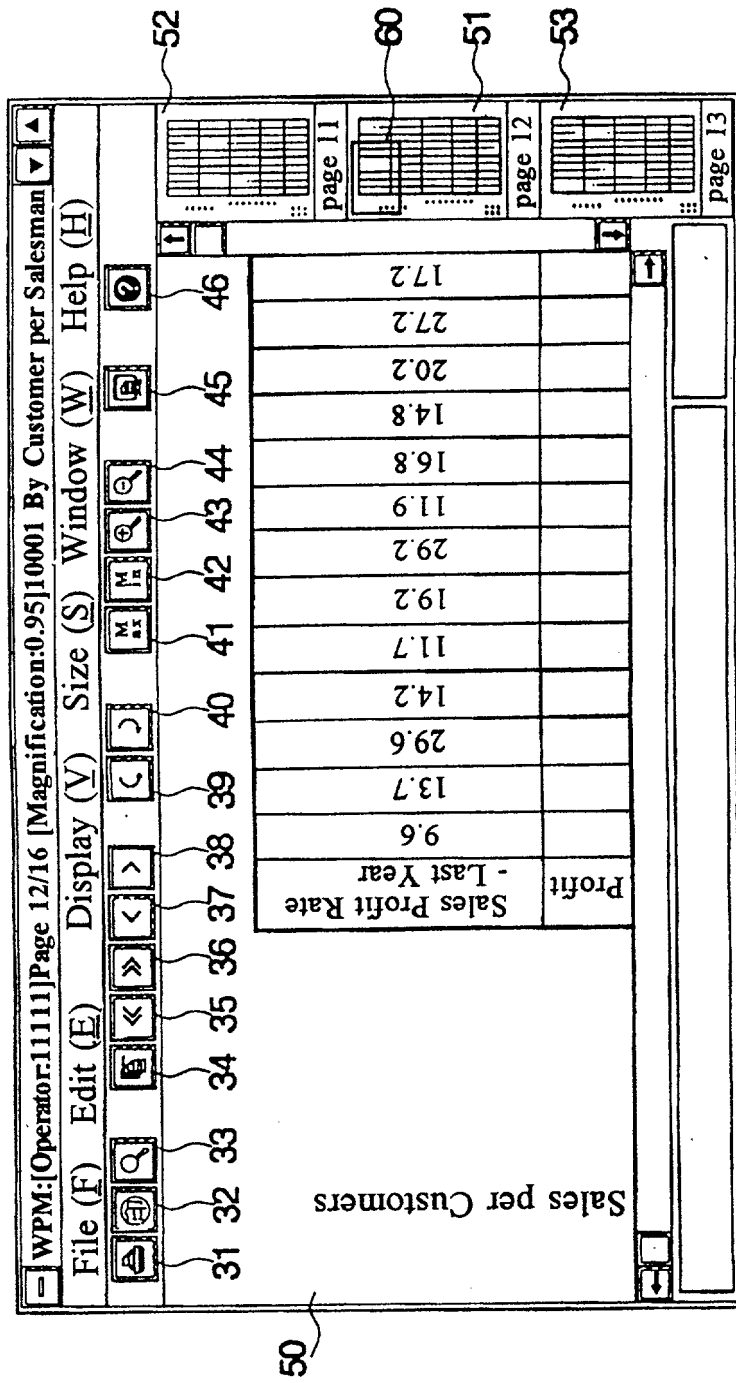
ABSTRACT

The disclosed invention allows the user to move to an area
to which the user desires to display in a page to which the user
desires to move by a single manipulation and to allow next
page/preceding page operation to be done only by a mouse
operation. An area displayed on the main screen **50** is displayed
on the sub-screen **51** of a reduced image of the page which is
currently displayed on the main screen **50** with a rectangular view
frame **60**. Dragging the view frame **60** by a mouse within the page
causes the display area in the main screen to move in real time.
Dragging the view frame of the sub-screen **51** to a neighboring
page causes the view frame **60** to be moved in the moved sub-
screen. Dropping the view frame at the place on the neighboring
sub-screen to which the view frame **60** moved causes the main
screen to be switched to that page to display the place indicated
by the view frame in the main screen. Simultaneously, the sub-
screen is scrolled so that the sub-screen of the page displayed
in the main screen comes to the center of the sub-screen column.
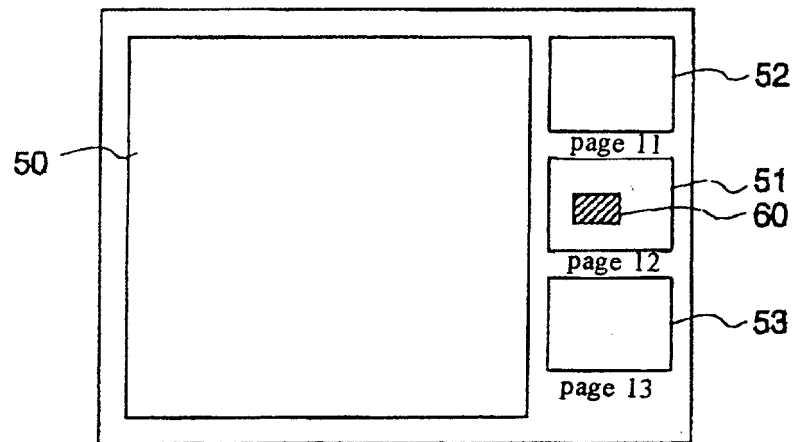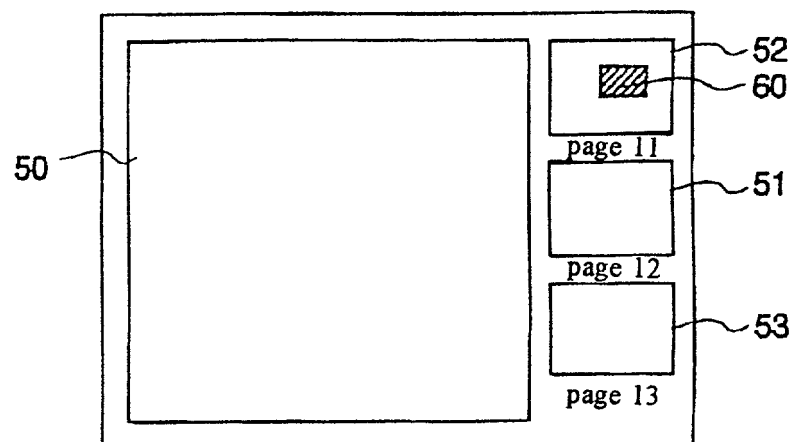
[Document Type]　Drawing

[Figure 1]

[Figure 2]

WPM:[Operator:11111]Page 12/16 [Magnification:0.95]10001 By Customer per Salesman

File (F)　Edit (E)　Display (V)　Size (S)　Window (W)　Help (H)

31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46

Sales per Customers

Profit	Sales Profit Rate - Last Year
	9.6
	13.7
	29.6
	14.2
	11.7
	19.2
	29.2
	11.9
	16.8
	14.8
	20.2
	27.2
	17.2

52　60　51　53

page 11　page 12　page 13

50

[Figure 3]

(A)

(B)

(C)

[Figure 4]

[Figure 5]

[Start]

S1 — Dragged ? — No
Yes

S2 — Start Acquisition of Message

S3 — Move within Screen ? — Yes
No

S4 — Notify Movement

S5 — Dropped ? — No
Yes
[End]

<Main Screen Image Window>
S6 — Movement of Display Screen Position
[End]

S7 — Re-draw Inverted Rectangle

S8 — Dropped ? — Yes
No

S9 — Notify Moved Page

S13 — Notify Display Position Information
[End]

<Sub-screen Parent Window>
S10 — Creation/Movement of Sub-screen Image Window
[End]

<Main Screen Image Window>
S11 — Draw Designated Page
S12 — Notify to Complete Drawing

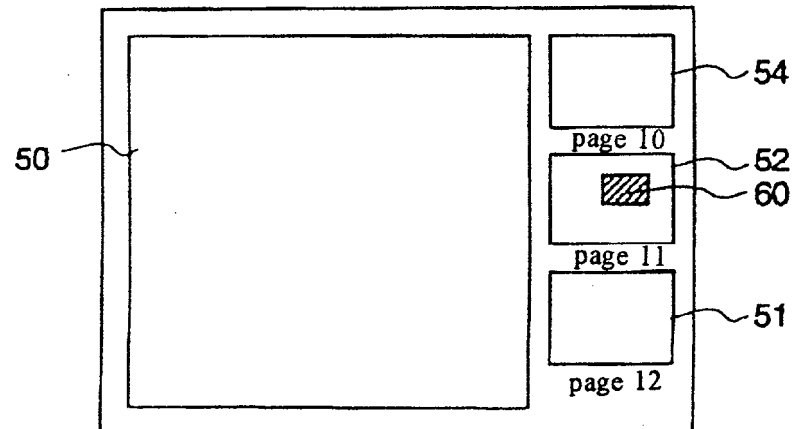<Main Screen Image Window>
S14 — Movement of Display Screen Position
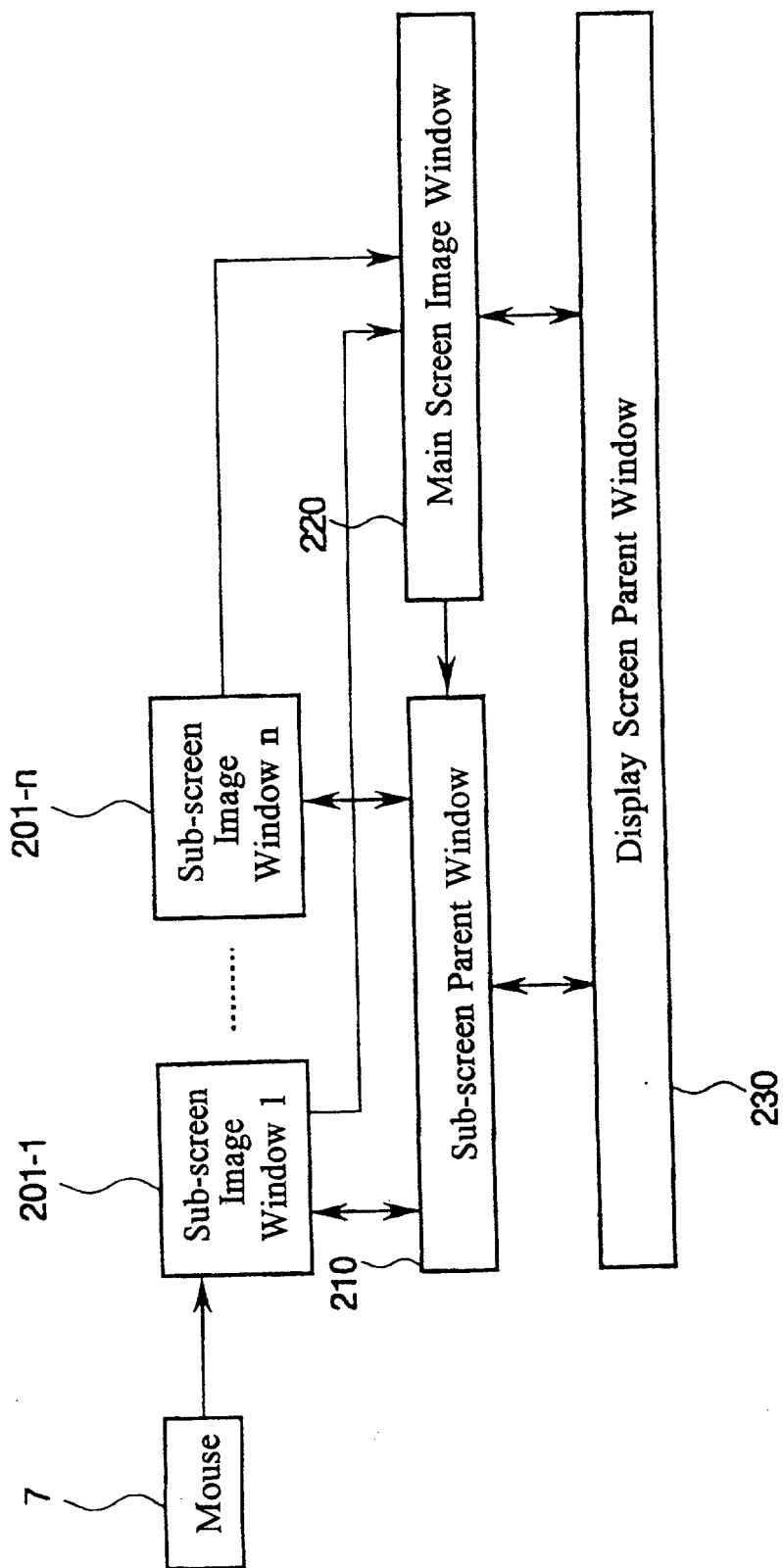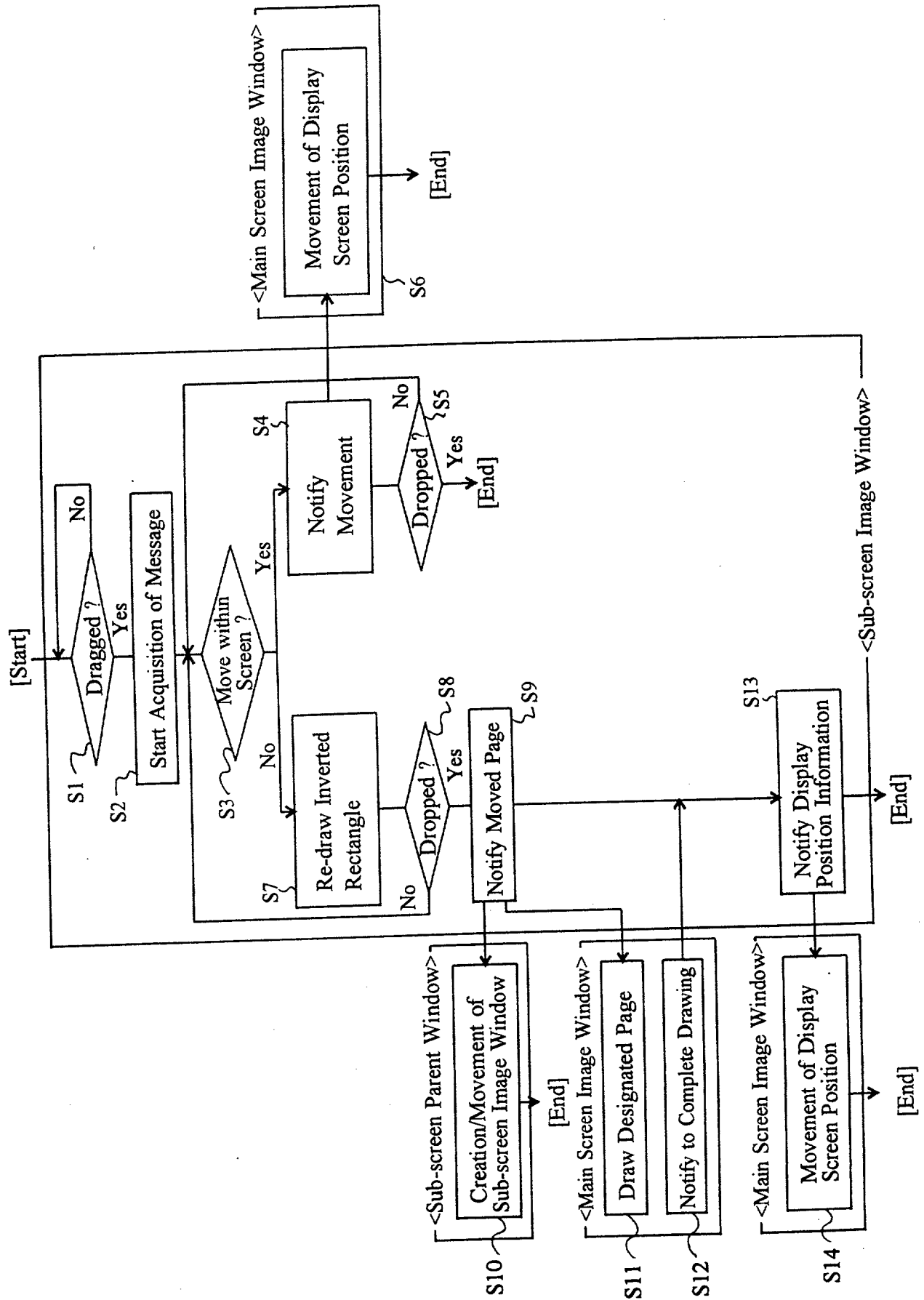[End]

<Sub-screen Image Window>

DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION
DOCKET: JA997028

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name;

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

WINDOW DISPLAY DEVICE and METHOD, and RECORDING MEDIUM RECORDING a WINDOW DISPLAY CONTROL PROGRAM

the specification of which (check one)

_X_ is attached hereto.
___ was filed on _____
       as Application Serial No. _____
    and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)   Priority Claimed

__09-68537_____   ____JAPAN____   ___21/03/97_____   _X_Yes ___No
   (Number)   (Country)   (Day/Month/Year Filed)

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56, which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

_____None_____   _____   _____
(Application Serial No.)   (Filing Date)   (Status) (patented, pending, abandoned)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION   DOCKET: JA997028

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (list name and registration number)

David J. Kappos (#34,357)   Marilyn Smith Dawkins (#31,140)
Prentiss W. Johnson (#22,123)   John H. Holcombe (#20,620)
Christopher A. Hughes (#26,914)   Edward A. Pennington (#32,588)
John H. Hoel (#26,   )   Joseph C. Redmond (#32,588)
Ingrid M. Foerster (#36,511)

Send correspondence to: D. A. Kappos
                         IBM Corporation
                         Intellectual Property Law
                         555 Bailey Avenue
                         San Jose CA 95141

Direct Telephone Calls to: (name and telephone number)John H. Holcombe, 520-760-6629

Full name of sole or first joint-inventor: AKIRA YOSHIDA

Inventor's signature: Date:

Residence: #304, 2-15-10 Shibuya, Yamato-shi, Kanagawa-ken, JAPAN

Citizenship: Japan

Post Office Address: Same